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ABSTRACT

The consistency by which shared abilities are assessed on three intelligence tests was investigated. Instruments under consideration include: the Wechsler Intelligence Scale for Children-Revised, the Kaufman Assessment Battery for Children, and the Stanford-Binet Intelligence Scale-Fourth Edition. A list of shared abilities and the subtests measuring them was developed for each test. Of the 52 shared abilities, 15 (29%) were measured by all three tests, 9 (17%) were measured by two of the tests, and 28 (54%) were measured by only one instrument. These results are presented in a table that lists the subtests of each instrument and which abilities are measured by each. The consistency by which shared abilities are measured was analyzed by nature of the stimulus (verbal, visual, or a combination of the two), mode of response (verbal or non-verbal), and task demands of the subtests. Of the 15 shared abilities measured by all three tests, only one is measured by subtests in which the nature of the stimuli and response mode are the same and in which there are no differences in the nature of the tasks. The analysis of each shared ability is presented along with a discussion of the results of the analysis. Guidelines and precautions in the use of shared ability analysis across tests are presented. (Author/TJH)

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Shared Ability Analysis Across Tests: A Cautionary Note

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Paper presented at Annual Meeting of American Psychological Association, Boston, August 1990.

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Abstract

This paper examines the consistency by which shared abilities are assessed on the WISC-R, K-ABC and S-B:FE. A list of shared abilities and the subtests measuring them was developed for each test by consulting the works of Kaufman (1979), Kaufman and Kaufman (1983) and Delaney (1987). Of the 52 shared abilities, 15 or 29% are measured by all three tests, 9 or 17% are measured by two of the three tests and 28 or 54% are measured by only one instrument. These results are presented in an easy-to-use table that provides an alphabetical list of shared abilities and the subtests of each instrument that measure the individual shared abilities. The consistency by which shared abilities are measured was analyzed by nature of the stimulus (verbal, visual or a combination), mode of response (verbal or nonverbal) and task demands of the subtests. Of the 15 shared abilities measured by all three tests, only one is measured by subtests in which the nature of the stimuli and response mode are the same and in which there are no differences in the nature of the tasks. The analysis of each shared ability is presented along with a discussion of the results of the analysis. Finally, guidelines and precautions in the use of shared ability analysis across tests are presented.

The successive levels approach to the interpretation of intelligence tests, which was popularized by Kaufman (1979) for interpreting the Wechsler Intelligence Scale for Children-Revised (WISC-R), has subsequently been applied to other intelligence tests as well. One aspect of this approach is a focus on the abilities that are shared with other subtests. Kaufman (1979) hypothesized the existence on the WISC-R of abilities based on factor analysis (verbal comprehension, perceptual organization, freedom from distractibility); Guilford's Structure of Intellect Model (cognition, evaluation, memory, convergent production); Bannatyne's recategorization of WISC-R subtests (verbal conceptualization, spatial ability, sequencing ability, acquired knowledge) and abilities based on "clinical, theoretical and rational perspectives" (p. 109). Likewise, A. S. Kaufman and N. L. Kaufman (1983) applied the approach to the Kaufman Assessment Battery for Children (K-ABC) and produced a number of shared abilities such as attention to visual detail, auditory short-term memory, verbal comprehension and spatial ability. Meanwhile, Delaney (1987) hypothesized a number of inferred abilities from the subtests of the Stanford-Binet: Fourth Edition (S-B:FE) ranging from vocabulary development to visual memory to social knowledge.

To date the psychometric difficulties with profile analysis (Kamphaus & Harrison, 1986) and the consensus between practitioners and test authors in identifying skills and abilities measured by individual subtests (Bracken & Fagan, 1988) have been examined.

One aspect of shared ability analysis that has not been fully addressed, however, is the consistency by which shared abilities are measured across tests. Lyon and Smith (1986) examined agreement rates between identified strengths and weaknesses in shared abilities and influences on the WISC-R and K-ABC for a sample of students referred for learning disability evaluations. An agreement rate of .04 was obtained. Although Lyon and Smith (1986) suggested the low agreement rate may have been the result of differences in how the shared abilities and influences were measured across tests, a detailed analysis of the methods by which shared abilities are measured was not provided. As children's performances on multiple measures of intelligence are often compared, it is important that shared ability analysis across tests be examined in greater detail. Therefore, the purpose of this paper is to explore the manner by which shared abilities are measured on the WISC-R, K-ABC and S-B:FE.

Procedure

A list of shared abilities and the subtests measuring them was developed for each test by consulting the works of Kaufman (1979), Kaufman and Kaufman (1983) and Delaney (1987). Only shared abilities measured by two or more subtests were included. In order to examine the consistency by which shared abilities were measured, each subtest measuring a shared ability was analyzed by nature of the stimulus (predominantly verbal or visual or a combination) and mode of response (predominantly verbal or nonverbal). Finally, the

task demands of the subtests were examined.

Four school psychologists trained in the administration and interpretation of the WISC-R and S-B:FE independently evaluated each subtest on the basis of stimulus and response demands. A subtest was described as having predominantly verbal stimulus demands if at least two-thirds of the items were presented verbally and the items could not be solved without the verbal stimuli. Likewise, a subtest was described as having predominantly visual stimulus demands if at least two-thirds of the items were presented visually and the items could not be solved without the visual stimuli. Thus, the performance subtests of the WISC-R, for example, were evaluated as having visual stimulus demands even though verbal instructions are included. An initial agreement rate of 88% was obtained. Those subtests in which unanimous agreement was not indicated were discussed by the group and resolved by consensus. The response/demand analysis presented in the Interpretive Manual of the K-ABC (Kaufman & Kaufman, 1983) was used for that test. These data were then used to analyze the consistency by which shared abilities were measured across the three instruments.

Results and Discussion

The stimulus and response demands of the K-ABC, WISC-R and

S-B:FE subtests are presented in Table 1

Insert Table 1 about here

Of the three tests, the WISC-R is characterized by having the most subtests in which stimulus and response demands are consistent (verbal stimulus, verbal response or visual stimulus and nonverbal response). The K-ABC, meanwhile, has more subtests (5) in which the stimulus and response demands are mixed (verbal stimulus, nonverbal response or visual stimulus, verbal response). The S-B:FE, compared to the WISC-R and K-ABC, has more subtests (3) in which a combination of visual and verbal stimuli are used.

The list of shared abilities and the K-ABC, WISC-R and S-B:FE subtests measuring them is presented in Table 2.

Insert Table 2 about here

Of the 52 shared abilities, 15 or 29% are measured by all three instruments, 9 or 17% are measured by two of the three instruments, and 28 or 54% are measured by only one instrument. Although numerous studies indicate these three tests correlate moderately with each other, the shared abilities measured by the instruments vary greatly. These results are indicated below:

Abilities measured by all three tests:

Acquired Facts/Information
Distinguishing Essential from Nonessential Detail
Long-term Memory
Number Facility
Part-Whole Relationships (Synthesis)
Sequencing
Short-term Memory
  --Auditory
  --Visual
Spatial Ability
Verbal Comprehension
Verbal Concept Formation
Verbal Expression
Visual Motor Coordination
Visual Perception of
  --Abstract Stimuli
  --Meaningful Stimuli

Abilities measured by only two tests (with tests in brackets):

Analysis (Visual)	[	K-ABC,	S-B:FE]
Perceptual Organization	[WISC-R,	K-ABC	]
Planning Ability	[WISC-R,		S-B:FE]
Reasoning	[WISC-R,	K-ABC	]
Reproduction of a Model	[WISC-R,	K-ABC	]
Simultaneous Processing	[WISC-R,	K-ABC	]
Social Judgment/Knowledge	[WISC-R,		S-B:FE]
Visual Organization	[WISC-R,	K-ABC	]
Word Knowledge/Vocabulary Development	[	K-ABC,	S-B:FE]

Abilities measured by only one test (with test in brackets):

Abstract Thinking	[WISC-R		]
Attention to Visual Detail	[	K-ABC	]
Brief Stimuli	[WISC-R		]
Cognition	[WISC-R		]
Common Sense	[WISC-R		]
Convergent Production	[WISC-R		]
Crystallized Ability	[	K-ABC	]
Early Language Development	[	K-ABC	]
Evaluation	[WISC-R		]
Fluid Ability	[	K-ABC	]
Freedom from Distractibility	[WISC-R		]
Holistic Processing	[WISC-R		]
Inductive Reasoning	[		S-B:FE]
Integrated Functioning	[WISC-R		]
Learning Ability	[WISC-R		]
Little Verbal Expression	[WISC-R		]
Long Stimuli	[WISC-R		]

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Manual Dexterity	[		S-B:FE]
Math Concepts/Comprehension	[		S-B:FE]
Mental Alertness	[WISC-R		]
Novel Verbal Stimuli	[WISC-R		]
Paper/Pencil Skill	[WISC-R		]
Reading Ability	[	K-ABC	]
Recall	[WISC-R		]
School-Related Skills	[	K-ABC	]
Successive Processing	[WISC-R		]
Verbal Conceptualization	[WISC-R		]
Visual Imagery	[		S-B:FE]

Many shared abilities are measured by a limited number of subtests. For example, Abstract Thinking, Common Sense, Holistic Processing, Learning Ability, Mental Alertness, Paper/Pencil Skill and Reading Ability are measured by one instrument only and by only two subtests within the one instrument. The number of shared abilities measured by each test also varies from 23 for the S-B:FE to 28 for the K-ABC to 40 for the WISC-R.

Stimulus and response demands

In examining the consistency by which shared abilities are measured across tests, both the nature of the stimulus (verbal, visual or a combination) and the mode of response (verbal or nonverbal) were considered. Only shared abilities measured by at least two instruments were analyzed. The results of that analysis are summarized in Table 3.

Insert Table 3 about here

An inspection of Table 2 reveals great variation in the stimulus demands of the subtests measuring the 24 shared abilities.

The K-ABC uses subtests with verbal stimuli and subtests with visual stimuli to measure 16 of the shared abilities, while the WISC-R and S-B:FE use this verbal/visual subtest combination for only 5 shared abilities. At the same time, the WISC-R and S-B:FE each use verbal stimuli exclusively to measure 6 and 5 shared abilities, respectively, as compared to none for the K-ABC. The WISC-R uses visual stimuli exclusively to measure 11 shared abilities as compared to 6 for the K-ABC and 8 for the S-B:FE. Thus, great variability exists in the stimulus requirements of subtests measuring these shared abilities. It is, therefore, possible that a child's performance on a shared ability construct might be adversely or favorably affected by the stimulus requirements of the subtests. In such cases, conflicting results across tests could be present due to the varying stimulus requirements of the subtests.

Response demands for the subtests also vary greatly. S-B:FE subtests require verbal responses on 10 shared abilities as compared to 6 for the WISC-R and 4 for the K-ABC. The WISC-R requires nonverbal responses on 11 shared abilities as compared to 7 for the S-B:FE and 2 for the K-ABC. At the same time, the K-ABC uses a combination of subtests some of which require verbal responses and others which require nonverbal responses for 15 shared abilities as compared to 5 for the WISC-R and 1 for the S-B:FE. The S-B:FE measures Number Facility with two subtests, Number Series and Equation Building, in which verbal responses can

substitute for the usual written response. Based on response demands, the S-B:FE appears to be somewhat more verbal than the WISC-R and K-ABC in the measurement of the shared abilities listed in Table 2. The K-ABC, on the other hand, appears to present a greater variety in response mode with more than half of the shared abilities measured by a combination of subtests requiring verbal responses and subtests requiring nonverbal responses. The WISC-R measures the shared abilities with more subtests requiring pencil skills (Mazes, Coding) than the S-B:FE (Copying) and the K-ABC (which has none).

Task demands of subtests

Subtests measuring each shared ability were also analyzed for differences in their task demands. Similar task demands were indicated for Analysis (Visual), Distinguishing Essential from Nonessential Detail, Perceptual Organization, Simultaneous Processing, Social Judgment/Knowledge, Visual Organization, Visual Perception of Meaningful Stimuli and Word Knowledge/Vocabulary Development. Differences in task demands were noted in these shared abilities:

Acquired Facts/Information: The WISC-R includes an arithmetic subtest whereas the K-ABC and S-B:FE do not.

Long-term Memory: Academic tasks are included for all three tests with only the K-ABC including non-academic tasks, too.

Number Facility: Pencil skill is needed on the WISC-R Coding subtest but not on the K-ABC or S-B:FE subtests.

Part-Whole Relationships (Synthesis): Both meaningful and nonmeaningful material is used on WISC-R and K-ABC subtests while the S-B:FE uses nonmeaningful material only.

Planning Ability: Meaningful material is used on the WISC-R Picture Arrangement subtest while nonmeaningful material is used on the S-B:FE. Pencil skills are needed for the WISC-R Mazes subtest but not for S-B:FE subtests.

Reasoning: Pencil skill is needed for the WISC-R Mazes subtest but not on K-ABC subtests.

Reproduction of a Model: Pencil skill is needed on the WISC-R Coding subtest but not on the K-ABC subtests.

Sequencing: Digits forward and backward are used on the WISC-R and S-B:FE; only digits forward is used on the K-ABC.

Short-term Memory (Auditory): Meaningful material is used on one S-B:FE subtest (Memory for Sentences) while nonmeaningful material is used on all other subtests. Digits forward only is used on the K-ABC, while digits forward and backward are used on the WISC-R and S-B:FE.

Short-term Memory (Visual): Pencil skill is needed for the WISC-R Coding subtest but not on the K-ABC or S-B:FE subtests.

Spatial Ability: Pencil skill is needed on the WISC-R Mazes subtest and S-B:FE Copying subtest but not on the K-ABC subtests. Meaningful material is utilized on some WISC-R and K-ABC subtests, but not on S-B:FE subtests.

Verbal Comprehension: Items involving social judgment are

included on the WISC-R and S-B:FE but not on the K-ABC.

Verbal Concept Formation: The K-ABC uses two reading subtests to assess this ability and the WISC-R and S-B:FE do not.

Verbal Expression: The WISC-R and S-B:FE require multi-word responses whereas the K-ABC requires one word responses.

Visual Motor Coordination: Pencil skill is needed on the WISC-R and S-B:FE but not on the K-ABC.

Visual Perception of Abstract Stimuli: Pencil skill is needed on the WISC-R and the S-B:FE.

Of the 15 shared abilities measured by the WISC-R, S-B:FE and K-ABC, only one (Visual Motor Coordination) is measured by subtests in which the stimuli are the same (visual), the response mode is the same (nonverbal) and there are no differences in the nature of the tasks. Other shared abilities, such as Sequencing, Short-term Memory (Auditory and Visual), Visual Perception of Abstract Stimuli and Visual Perception of Meaningful Stimuli involve stimuli that are presented similarly but response mode varies or the items measuring the shared ability have different task demands. For example, memory tasks involving memory of numbers include both forward and reverse tasks on the WISC-R and S-B:FE but forward only on the K-ABC. Pencil skills are necessary for the WISC-R subtests of Coding and Mazes which involve the shared abilities of Reasoning, Short-term Memory--Visual, Simultaneous Processing and Visual Perception of Abstract Stimuli. For shared abilities involving two of the three tests, similar problems are present with

no shared abilities measured by subtests having stimulus, response mode and task demands that are the same.

Difficulties in using shared ability analysis

Clearly, a major weakness of shared ability analysis is that a common set of shared abilities has not been used to describe each intelligence test. Each author has used a different set of shared abilities to describe each test. For example, the construct of abstract thinking is used as a shared ability for the WISC-R, while it is not used in analyzing the K-ABC and S-B:FE. And yet, most school psychologists would agree that all three tests include measures of abstract thinking. Thus, the absence of subtests on a shared ability construct may simply indicate that the test has not been analyzed from that perspective by authors of the interpretive approaches.

Another difficulty with shared ability analysis is that different shared abilities are measured by the same cluster of subtests. For example, the Arithmetic, Digit Span and Coding subtests of the WISC-R measure Freedom from Distractibility, Number Facility and Sequencing. On the S-B:FE, Comprehension and Absurdities measure Acquired Facts/Information as well as Social Judgment/Knowledge. While this increases the flexibility of interpretation, it also underscores the importance of other factors such as test behavior and background information in developing an appropriate interpretation. It may also be somewhat confusing for the less experienced practitioner. The lack of empirical studies

to clarify the actual constructs measured by the subtest groups further complicates shared ability interpretation.

An additional difficulty with shared ability analysis is the method by which the groupings of subtests were determined. As Kaufman (1979) forthrightly stated "Apart from the empirical technique of factor analysis, [many of the shared abilities and influences] have been derived from clinical, theoretical, and rational perspectives accumulating from psychologists experiences with the Wechsler scales for more than 40 years" (p. 109). Similar techniques were used to group subtests on the shared ability dimensions of the K-ABC and the S-B:FE. For example, the shared abilities of the K-ABC are described by Kaufman and Kaufman (1983) as "self-explanatory [with two exceptions], and virtually all are familiar to clinicians who routinely administer the Wechsler scales" (p. 197). Delaney (1987) describes the inferred abilities on the S-B:FE as "potential examinee attributions that may be labeled shared abilities and influences, cognitive strategies, or performance variables. These are arbitrary designations and are provided solely to assist the examiner with his or her interpretive evaluation" (p. 83). In many cases, therefore, the construct is not defined by empirical data.

Finally, practitioners and test authors do not necessarily agree on the abilities measured by specific subtests (Bracken & Chattin, 1990; Bracken & Fagan, 1988). Often there is no clear definition of the shared ability itself and the components of the

construct are based on a combination of clinical and subjective factors. Delaney's (1987) attempt to define the inferred abilities of the S-B:FE is a promising development. Disagreements, however, still exist on the degree to which subtests measure these abilities. As Bracken and Fagan (1988) indicate this lack of an "operational definition" for shared abilities may contribute to the variability in shared ability interpretation. Individual practitioners may both define the shared ability constructs and analyze the skills needed to perform successfully on individual subtests in different ways.

Guidelines for using shared ability analysis

Perhaps the most important advantage of shared ability analysis is the flexibility that it provides in interpretation. It offers the opportunity to examine performance in a number of specific areas measured by the WISC-R, K-ABC and S-B:FE. As emphasized by Kaufman (1979) the appropriate use of shared ability analysis is to generate hypotheses about test performance. Hypotheses can be examined, additional data collected as needed, and the hypotheses confirmed or rejected based on these data. In this way, additional insight regarding how children learn and the kinds of tasks on which they perform well or poorly can be developed.

Shared ability analysis is designed to provide information about an individual's performance in specific areas. Therefore, Table 2 may be useful in deciding which test(s) to utilize as part

of the assessment process. If information is needed on performance in specific skill areas, then Table 2 can be used to determine which test(s) assess these areas. Table 3 can be used to determine the appropriateness of the subtests based on their stimulus and response demands. For example, if information is needed on Long-term Memory, Table 2 indicates that all three tests measure that ability. Table 3 reveals that the WISC-R and S-B:FE utilize subtests with verbal stimuli and subtests that require verbal responses, while the K-ABC utilizes some subtests with verbal stimuli and others with visual stimuli and a combination of response demands (some verbal and some nonverbal). Thus, the examiner can make an informed decision on which instrument to use.

Shared ability analysis, however, should be undertaken cautiously. From the present analysis, a number of precautions are in order:

1. When two or more instruments are used in the assessment process, it is important to be aware that in most cases shared abilities are measured very differently across instruments. The use of the same term to describe a construct such as Acquired Facts/Information does not mean the construct is measured in the same way by each instrument. It is vital to analyze the stimulus, response and task demands of the subtests as these factors may affect performance rather than the hypothesized shared abilities.

2. The shared abilities are based on individual views of the abilities measured by the subtest with empirical data lacking in

many cases. As previously demonstrated by Bracken and Fagan (1988) test authors and practitioners differ on their views of the abilities measured by individual subtests.

3. Authors of interpretive approaches do not use the same set of shared abilities to describe each test. For example, abstract thinking is a shared ability for the WISC-R but not for the K-ABC or S-B:FE. Thus, the absence of subtests on a shared ability dimension may mean that the particular dimension was not used to analyze the abilities measured by the particular instrument.

4. The classification of subtests into shared ability categories is not consistent among authors. For example, Delaney (1988) classifies Arithmetic as a measure of verbal expression whereas the arithmetic subtests on the WISC-R and K-ABC are not classified this way.

5. In most cases, operational definitions have not been provided for the shared ability constructs. Thus, their meaning may be interpreted very differently by different practitioners. To facilitate clear communication it may be helpful to explain how the shared ability was measured.

Shared ability analysis is often taught in school psychology graduate programs and is discussed in the major textbooks used in intellectual assessment courses. The results of this study suggest that instruction in the use of shared ability analysis be supplemented with activities such as these:

1. Familiarize students with the inconsistencies inherent in

shared ability analysis across tests.

2. Provide training and activities in analyzing the stimulus, response and task demands of subtests.

3. Compare student and practitioner perceptions of abilities measured by subtests.

4. Utilize case studies in which shared ability analysis is used and produces both consistent and contradictory results.

When used appropriately and cautiously, shared ability analysis can provide useful information regarding an individual's performance on a wide array of abilities. It should always be pursued in combination with other interpretive approaches and with the knowledge that its results are hypotheses...hypotheses which should be confirmed or rejected based on additional data.

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Table 1

Stimulus and response demands of K-ABC, WISC-R and S-B:FE subtests

	Stimulus			Response		
	Verbal	Visual	Combination	Verbal	Nonverbal	Combination
WISC-R						
Information	X			X		
Similarities	X			X		
Arithmetic	X			X		
Vocabulary	X			X		
Digit Span	X			X		
Picture Comp.		X				X
Picture Arrgmt.		X			X	
Block Design		X			X	
Object Assembly		X			X	
Coding		X			X	
Mazes		X			X	
K-ABC						
MW		X		X		
FR		X			X	
HM		X			X	
GC		X		X		
NR	X			X		
T		X			X	
WO			X		X	
MA		X			X	
SM		X			X	
PS		X			X	
EV		X		X		
FP		X		X		
A			X	X		
R	X			X		
RD		X		X		
RU		X			X	
S-B:FE						
V	X			X		
C	X			X		
Abs		X		X		
VR	X			X		
PA		X			X	
Cpy		X			X	

M		X			X	
PFC		X			X	
Q			X			X
NS			X	Oral or written		
EB			X	Oral or written		
BM		X			X	
MFS	X			X		
MFD	X			X		
MFO		X			X	

Subtest abbreviations:

WISC-R: Picture Comp = Picture Completion; Picture Arrgmt = Picture Arrangement.

K-ABC: MW = Magic Window; FR = Face Recognition; GC = Gestalt Closure; HM = Hand Movements; NR = Number Recall; T = Triangles; WO = Word Order; MA = Matrix Analogies; SM = Spatial Memory; PS = Photo Series; EV = Expressive Vocabulary; FP = Faces & Places; A = Arithmetic; R = Riddles; RD = Reading Decoding; RU = Reading Understanding.

S-B:FE: V = Vocabulary; C = Comprehension; Abs = Absurdities; VR = Verbal Relations; PA = Pattern Analysis; Cpy = Copying; M = Matrices; PFC = Paper Folding & Cutting; Q = Quantitative; NS = Number Series; EB = Equation Building; BM = Bead Memory; MFS = Memory for Sentences; MFD = Memory for Digits; MFO = Memory for Objects.

Table 2

Comparison of shared abilities: WISC-R, K-ABC and S-B:FE Subtests

	WISC-R	Subtests of K-ABC	S-B:FE
Abstract Thinking	S,V		
Acquired Facts/Information	I,A,V	EV,FP,R	C,Abs
Analysis (Visual)		T,MA,PS	PA,M,PFC,BM,MFO
Attention to Visual Detail		MW,FR,GC,MA,PS	
Brief Stimuli	S,V,DS		
Cognition	I,S,A,V, PC,BD,OA,M		
Common Sense	C,PA		
Convergent Production	S,PA,Cd		
Crystallized Ability		EV,FP,A,R,RD,RU	
Early Language Development		GC,WO,EV,R,RD	
Essential/Nonessen. Detail	S,PC,PA	MW,FR,MA,PS,R	Abs,VR
Evaluation	C,PC,PA,BD,OA,Cd		
Fluid Ability		FR,HM,NR,T,WO,MA,SM	
Freedom fm Distractibility	A,DS,Cd		
Holistic Processing	PC,OA		
Inductive Reasoning			VR,M,PFC,NS,EB
Integrated Functioning	PA,BD,Cd,M		
Learning Ability	V,Cd		
Little Verbal Expression	I,A,DS		
Long Stimuli	I,A,C		
Long-term Memory	I,A,V	MW,GC,EV,FP,A,R,RD,RU	V,VR
Manual Dexterity			PA,Cpy,BM
Math Concepts/Comprehension			Q,NS,EB
Mental Alertness	A,DS		
Novel Verbal Stimuli	S,V,DS		
Number Facility	A,DS,Cd	NR,A	NS,EB
Paper and Pencil Skill	Cd,M		
Part-Whole Relationships (Synthesis)	PA,BD,OA	MW,GC,NR,PS,R	PA
Perceptual Organization	PC,PA,BD,OA,M	HM,GC,T,MA,SM,PS	
Planning Ability	PA,M		PA
Reading Ability		RD,RU	
Reasoning	S,A,C,PA,M	T,MA,PS,A,R	
Recall	I,V,DS		
Reproduction of a Model	BD,Cd	HM,NR,T,SM	
School Related Skills		A,RD,RU	
Sequencing	A,DS,Cd	HM,NR,WO	BM,MFD,MFO
Short-term Memory			
--Auditory	DS	NR,WO	MFS,MFD
--Visual	PC,Cd	MW,FR,HM,SM	BM,MFO
Simultaneous Processing	PC,BD,OA	MW,FR,GC,T,WO,MA,SM,PS	

Social Judgment/Knowledge	C,PA		C,Abs
Spatial Ability	PC,BD,OA,M	MW,HM,GC,T,MA,SM,PS	PA,Cpy,M,PFC
Successive Processing	PA,Cd,M		
Verbal Comprehension	I,S,V,C	WO,A,R	C,MFS
Verbal Concept Formation	S,V	EV,R,RU	V,VR
Verbal Conceptualization	S,V,C		
Verbal Expression	S,V,C	MW,GC,EV,FP,R,RD	V,C,A,VR
Visual Imagery			Cpy,M,BM,MFO
Visual Motor Coordination	BD,OA,Cd,M	HM,T	PA,Cpy
Visual Organization	PC,PA	FR,GC,MA,SM,PS	
Visual Perception of			
--Abstract Stimuli	BD,Cd	T,MA,A	Cpy,M,PFC
--Meaningful Stimuli	PC,PA,OA	MW,FR,WO,PS,EV,FP,A	Abs
Word Knowledge/Vocabulary Development		EV,R	V,C,VR

Subtest abbreviations:

WISC-R: I = Information; S = Similarities; A = Arithmetic, V = Vocabulary; C = Comprehension; DS = Digit Span; PC = Picture Completion; PA = Picture Arrangement; BD = Block Design; OA = Object Assembly; Cd = Coding; M = Mazes.

K-ABC: MW = Magic Window; FR = Face Recognition; GC = Gestalt Closure; HM = Hand Movements; NR = Number Recall; T = Triangles; WO = Word Order; MA = Matrix Analogies; SM = Spatial Memory; PS = Photo Series; EV = Expressive Vocabulary; FP = Faces & Places; A = Arithmetic; R = Riddles; RD = Reading Decoding; RU = Reading Understanding.

S-B:FE: V = Vocabulary; C = Comprehension; Abs = Absurdities; VR = Verbal Relations; PA = Pattern Analysis; Cpy = Copying; M = Matrices; PFC = Paper Folding & Cutting; Q = Quantitative; NS = Number Series; EB = Equation Building; BM = Bead Memory; MFS = Memory for Sentences; MFD = Memory for Digits; MFO = Memory for Objects.

Table 3

Consistency of shared ability measurement by test

Ability	Test		
	WISC-R	K-ABC	S-B:FE
Acquired Facts/ Information			
Stimulus	Verbal	Verbal (R) Visual (EV,FP)	Verbal (C) Visual (Abs)
Response	Verbal	Verbal	Verbal
Analysis (Visual)			
Stimulus		Visual	Visual
Response		Nonverbal	Nonverbal
Distinguishing Essential fm Nonessential Detail			
Stimulus	Visual (PC,PA) Verbal (S)	Visual (MW,FR,MA,PS) Verbal (R)	Visual (Abs) Verbal (VR)
Response	Verbal (PC,S) Nonverbal (PA)	Verbal (MW,R) Nonverbal (FR,MA,PS)	Verbal
Long-term Memory			
Stimulus	Verbal	Verbal (R) Visual (MW,GC,EV, FP,RD,RU) Verbal/Visual (A)	Verbal
Response	Verbal	Verbal (MW,GC,EV, FP,A,R,RD) Nonverbal (RU)	Verbal
Number Facility			
Stimulus	Verbal (A,DS) Visual (Cd)	Verbal (NR) Verbal/Visual (A)	Verbal/Visual
Response	Verbal (DS,A) Nonverbal (Cd)	Verbal	Verbal or Nonverbal

Part-Whole Relationships (Synthesis)			
Stimulus	Visual	Visual (MW,GC,PS) Verbal (NR,R)	Visual
Response	Nonverbal	Verbal (MW,GC,NR,R) Nonverbal (PS)	Nonverbal
Perceptual Organization			
Stimulus	Visual	Visual	
Response	Nonverbal	Nonverbal (HM,T,MA,SM,PS) Verbal (GC)	
Planning Ability			
Stimulus	Visual		Visual
Response	Nonverbal		Nonverbal
Reasoning			
Stimulus	Verbal (S,A,C) Visual (PA,M)	Verbal (R) Visual (T,MA,PS) Verbal/Visual (A)	
Response	Verbal (S,A,C) Nonverbal (PA,M)	Verbal (A,R) Nonverbal (T,MA,PS)	
Reproduction of a Model			
Stimulus	Visual	Visual (HM,T,SM) Verbal (NR)	
Response	Nonverbal	Nonverbal (HM,T,SM) Verbal (NR)	
Sequencing			
Stimulus	Visual (Cd) Verbal (A,DS)	Visual (HM) Verbal (NR) Visual/Verbal (WO)	Visual (BM,MFO) Verbal (MFD)
Response	Verbal (A,DS) Nonverbal (Cd)	Verbal (NR) Nonverbal (HM,WO)	Verbal (MFD) Nonverbal (BM,MFO)
Short-term Memory			

--Auditory			
Stimulus	Verbal	Verbal(NR) Verbal/Visual (WO)	Verbal
Response	Verbal	Verbal (NR) Nonverbal (WO)	Verbal
Short-term Memory			
--Visual			
Stimulus	Visual	Visual	Visual
Response	Nonverbal	Verbal (MW) Nonverbal (FR,HM,SM)	Nonverbal
Simultaneous Processing			
Stimulus	Visual	Visual (MW,FR,GC,T,MA, SM,PS) Verbal/Visual (WO)	
Response	Nonverbal	Nonverbal (FR,T,WO,MA) (SM,PS) Verbal (MW,GC)	
Social Judgment/ Knowledge			
Stimulus	Verbal (C) Visual (PA)		Verbal (C) Visual (Abs)
Response	Verbal (C) Nonverbal (PA)		Verbal
Spatial Ability			
Stimulus	Visual	Visual	Visual
Response	Nonverbal	Nonverbal (HM,T, MA,SM,PS) Verbal (MW,GC)	Nonverbal
Verbal Comprehension			
Stimulus	Verbal	Verbal (R) Verbal/Visual (WO,A)	Verbal
Response	Verbal	Verbal (A,R)	Verbal

		Nonverbal (WO)	
Verbal Expression			
Stimulus	Verbal	Verbal (M,R) Visual (MW,GC,EV, FP,RD)	Verbal
Response	Verbal	Verbal	Verbal
Verbal Concept Formation			
Stimulus	Verbal	Verbal (R) Visual (EV,RU)	Verbal
Response	Verbal	Verbal (R,EV) Nonverbal (RU)	Verbal
Visual Motor Coordination			
Stimulus	Visual	Visual	Visual
Response	Nonverbal	Nonverbal	Nonverbal
Visual Organization			
Stimulus	Visual	Visual	
Response	Nonverbal	Nonverbal (FR,MA,SM,PS) Verbal (GC)	
Visual Perception of --Abstract Stimuli			
Stimulus	Visual	Visual (T,M) Verbal/Visual (A)	Visual
Response	Nonverbal	Nonverbal (T,M) Verbal (A)	Nonverbal
Visual Perception of --Meaningful Stimuli			
Stimulus	Visual	Visual (MW,FR,PS,EV,FP) Verbal/Visual (A,WO)	Visual
Response	Nonverbal	Nonverbal (FR,WO,PS) Verbal (MW,EV,FP,A)	Verbal
Word Knowledge/			

Vocabulary Dev.		
Stimulus	Verbal (R) Visual (EV)	Verbal
Response	Verbal	Verbal

Notes:

If stimulus or response demands varied within an instrument, the subtests with each stimulus or response are indicated in parentheses.

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